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NOTES

THE FEDERAL RESERVE BOARD'S PRICE INDEX FOR GREAT BRITAIN

BY KATHARINE SNODGRASS

In the QUARTERLY for September, 1920, an article was published describing the Federal Reserve Board's index of American prices, the first of a series of international indexes which the Board proposed to construct for the study of the relationship of prices in different countries. Since that time the British index number has been added to the series, and in the course of the next six months it is hoped that Japanese, Canadian, and French numbers will be completed.

CLASSIFICATION OF COMMODITIES

The British number is of approximately the same size as the American, *i. e.*, 60 to 65 different commodities are included, many of them represented by several quotations, so that the total number of different quotations is between 90 and 100 in both cases. For the most part, the same commodities are included in both indexes. The British index, however, contains 10 commodities which are not in the American, while the latter contains 7 which are not in the British.¹ The method of construction and the classification of commodities is the same in both cases. All commodities have first been separated into domestic or home produced materials, and imported goods. Each of these groups has then been subdivided into (1) raw materials, (2) producers' goods, and (3) consumers' goods. In the case of the British index the following ratios show the importance of each of these groups to the total:

RATIO OF GROUP INDEXES TO TOTAL IN BRITISH INDEX

	Goods produced	Goods imported	Raw materials	Producers' goods	Consumers' goods	All
Average, 1913....	Per cent 73	Per cent 27	Per cent 40	Per cent 30	Per cent 30	Per cent 100
June, 1921.....	77	23	40	27	33	100

¹ A list of the quotations used in the construction of the British index number with the sources from which the quotations were drawn may be found in the Federal Reserve Bulletin for February, 1922. A similar list for the American index is published on p. 500 of the Federal Reserve Bulletin for May, 1920. Revisions of this list may be found on p. 702 of the Bulletin for June, 1921, and p. 574, for May, 1922.

In the American index the ratios are very different for domestic and imported goods, and raw materials bear a higher ratio to manufactured goods than in the British index.

RATIO OF GROUP INDEXES TO TOTAL IN AMERICAN INDEX

	Goods produced	Goods imported	Raw materials	Producers' goods	Consumers' goods	All
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Average, 1913 . . .	93	7	45	19	36	100
June, 1921	96	4	43	19	38	100

One additional group index has been constructed for both countries, namely, that of the prices of goods exported. As in the case of imports, this index is more important for England than for the United States, the British export index bearing a ratio of 20–25 per cent to goods produced, while in the case of the American index the ratio is normally somewhat under 10 per cent. This classification of the goods included in the indexes under domestic, imported, and exported is especially interesting at the present time because of the maladjustment between domestic and foreign prices which has come about as a result of the limitations which have been placed upon the use of gold in foreign exchange. The further classification according to stage of manufacture is useful as supplementary information in the study of prices according to groups of industries. Until this index was constructed there was no British index which contained classifications other than those along industrial lines. The old Board of Trade index gave the foreign trade classification, but its results were vitiated by the fact that customs values instead of market quotations were used.

METHOD OF CONSTRUCTION

Both the American and the British index numbers are of the weighted, arithmetic type. In other words, each index is based upon the aggregate money value represented by the quantity of the goods produced and imported in 1913 multiplied by their prices. These aggregates are expressed in terms of percentages of the 1913 base which is assumed to be normal.¹ Considerable difficulty was encountered in arriving at satisfactory production weights for the British index because no census has been taken since 1907. In several industries studies had been made during the war, which were useful; but in a few cases it was necessary to be satisfied with rather rough estimates. Export and

¹ For more detailed description of the method of construction used in the American index, see p. 326 of the *Quar. Pub.*, of the Amer. Stat. Ass'n for September, 1920. The British index has been identically constructed.

import quantity weights were carefully adjusted by value figures so that there would be no over- or under-weighting in cases where price quotations of imports or exports were higher or lower than average. This type of adjustment could not be applied to the weighting of the "goods produced," however, because of inadequate data. In a few cases, such as the iron and steel industry, the weights were increased to give representation to commodities more highly manufactured than those in the index. The following table shows the importance of the several industries in the final index number for 1913:

IMPORTANCE OF THE SEVERAL INDUSTRIES IN BRITISH PRICE INDEX IN 1913

	Per cent
Grains.....	10
Meats.....	9
Other foods.....	11
Iron and steel.....	15
Coal and coke.....	17
Other minerals.....	3
Cotton.....	14
Wool.....	8
Other textiles.....	2
Miscellaneous.....	<u>11</u>
Total	100

PRICE QUOTATIONS

Considerable care was used both in the choice of the commodities included in the index and in the sources from which the quotations were taken. In general, it may be said that all of the leading British industries are represented in the index, some more satisfactorily than others, to be sure, but all to a certain degree. Probably the most serious omissions are woolen cloth, imported hides, and domestic leather. No quotations for woolen cloth are published and no manufacturers could be found who were willing to divulge their own quotations. There are also no satisfactory foreign hide or domestic leather prices available, partly because of the lack of any generally recognized standards for materials in the trade. Other lines which gave especial difficulty but for which quotations were finally obtained are raw wool, raw and finished tobacco, paper, and lumber. Reliable foreign wool prices are not published in any British trade paper in a form intelligible to the people who are not following the trade closely. After each auction, however, summaries of the prices which prevailed for the different grades of the commodity at the preceding auction are compiled by various wool brokers. This type of quotation has been used in the index and is probably as satisfactory a price as can be obtained for most commodities, except that the quotations are likely to be somewhat irregular. At the present time, however, auctions are held almost every month. Tobacco and lumber prices had to be obtained from private firms, since no satisfactory price-collecting agency seems to

exist in these industries. Prices could not be obtained for paper of any variety, and quotations for sulphate bleached were used to represent the industry.

Very satisfactory price-reporting services are conducted by the *British Board of Agriculture* for live stock and meat prices, by Bromhall's *Corn Trade News* for grains, the *Wool Record* for wool tops and yarns, the *Manchester Guardian* for cotton in all stages of manufacture, the *Iron and Coal Trades Review* for coal, the *Iron and Steel Trades Journal* for these and other metals, the *Chemical Trades Journal* for chemicals. Other periodicals which have been used are *The Grocer*, *Textile Mercury*, *Oil News*, *World's Paper Trade Review*, *Mark Lane Express Agricultural Journal*, *Leather World*, the *Statist*, and the

TABLE I
BRITISH INDEX NUMBER FOR THE POST-WAR PERIOD (1913=100)

	Goods produced	Goods imported	Goods exported	Raw materials	Producers' goods	Consumers' goods	All commodities
1919							
Jan.	221	244	242	210	238	241	227
Feb.	215	240	231	208	229	234	222
March	202	233	222	206	200	226	210
April	208	230	219	207	213	225	214
May	220	234	232	211	237	229	224
June	231	241	233	216	257	236	234
July	240	247	265	222	269	244	242
Aug.	250	246	278	234	277	243	249
Sept.	253	246	302	299	277	241	251
Oct.	262	259	332	250	288	249	261
Nov.	273	269	345	255	310	260	272
Dec.	283	280	399	261	331	267	287
1920							
Jan.	302	298	452	270	358	289	305
Feb.	316	314	478	281	392	291	320
March	327	319	483	287	406	300	329
April	332	324	486	292	409	306	334
May	341	322	484	306	406	310	340
June	344	306	469	308	396	311	339
July	330	299	452	307	363	302	326
Aug.	322	304	439	307	352	297	322
Sept.	319	288	421	301	341	296	315
Oct.	301	272	392	290	309	282	297
Nov.	285	253	369	282	278	267	280
Dec.	266	230	328	265	244	255	260
1921							
Jan.	252	207	246	233	231	261	244
Feb.	234	190	201	213	213	246	226
March	219	182	189	202	198	231	213
April	211	180	185	201	184	225	206
May	209	167	182	198	179	216	201
June	206	161	179	196	173	213	197
July	204	164	174	192	165	222	196
Aug.	202	165	168	193	161	223	195
Sept.	199	170	171	195	165	212	194
Oct.	192	163	175	187	166	200	187
Nov.	182	154	164	177	153	191	177
Dec.	176	152	158	173	147	186	172
1922							
Jan.	174	149	158	171	147	181	170
Feb.	171	148	151	168	144	181	167
March	172	147	153	170	142	183	168
April	171	148	152	167	143	183	167

Economist, the latter two only when no trade journal could be found which quoted prices. In the American price work it had been found that unless a large amount of money could be spent, it was preferable to use reliable trade publications as a source for quotations rather than private firms. The same is true of the British situation. It is only in the case of a few highly manufactured commodities such as shoes that quotations of private firms have been used.

THE INDEX NUMBERS

Neither the British index nor the American index was constructed for the war period. The indexes cover 1913 (which is used as the base period), 1919, 1920, and 1921 and are being constructed currently each month. The table preceding contains the British index numbers for the post-war period expressed in their ratio to the base period (1913). This number for all commodities agrees very closely with the new index of the British Board of Trade which was first published in the spring of 1921. The latter index has not been constructed for 1919, but during 1920 and 1921 there was a high degree of similarity in the movement of the two index numbers. The correlation of the Federal Reserve Board index with the *Economist* and the *Statist* indexes is not so great, although there is not a wide divergence between them. The Board of Trade index is based upon something over 150 price quotations, is roughly weighted, and is a geometric average; the *Economist* and the *Statist* indexes are only about a third as large as the Board of Trade index, are based mainly upon the prices of raw materials and semi-finished goods, are weighted only by the number of quotations assigned to each commodity, and are averaged arithmetically.

In a period of rapid price change like the one since the war it would be presumptuous to claim infallibility for any price index. For instance, if a weighted geometric instead of a weighted arithmetic average had been used in the construction of the Federal Reserve Board index in the months from January, 1920, to June, 1921, the level of British prices would have worked out 5 to 10 per cent lower than it does on the arithmetic basis. The greatest difference between the arithmetic and the geometric averages occurs when there is a wide deviation from the average in the prices of important commodities. During the period of highest prices in the spring of 1920, the dispersion of quotations for leading commodities was so wide that it is impossible to choose the point of greatest concentration. During this same period there was a relatively high degree of concentration of the prices of the less important commodities, but these combined had little influence in determining the final average. As the price level in England declined, the

dispersion of individual prices also diminished, and as a result the geometric and the arithmetic averages came into closer harmony. Although no definite experiments have been made, it cannot be doubted that a change in the period upon which the "weights" are based would make similar differences in the final index number, as would the addition or the elimination of an important commodity from the index.

In the following table the all-commodities indexes of these four agencies are compared:

TABLE II

ALL COMMODITIES WHOLESALE PRICE INDEX NUMBERS FOR ENGLAND
(1913=100)

	Federal Reserve Board	Board of Trade	Statist	Economist
1919				
Jan.	227	...	224	217
Feb.	222	...	220	215
March	210	...	217	212
April	214	...	217	214
May	224	...	229	222
June	234	...	235	230
July	242	...	243	239
Aug.	249	...	250	241
Sept.	251	...	252	245
Oct.	261	...	264	252
Nov.	272	...	271	259
Dec.	287	...	276	273
1920				
Jan.	305	303	288	288
Feb.	320	317	306	303
March	329	326	307	310
April	334	332	313	306
May	340	333	305	304
June	339	330	300	291
July	326	324	299	292
Aug.	322	320	298	287
Sept.	315	318	292	284
Oct.	297	309	282	266
Nov.	280	293	263	245
Dec.	260	269	243	220
1921				
Jan.	244	251	232	209
Feb.	226	230	215	192
March	213	215	208	189
April	206	209	199	183
May	201	206	191	182
June	197	202	183	179
July	196	198	186	178
Aug.	195	194	181	179
Sept.	194	191	175	183
Oct.	187	184	163	170
Nov.	177	176	161	165
Dec.	172	171	157	162
1922				
Jan.	170	167	156	159
Feb.	167	165	155	158
March	168	163	157	160
April	167	163	158	...

VALUE OF THE WORK

In 1919, when work was commenced on this series of international price indexes, there was the greatest dissimilarity among the numbers

in current use in the various countries. In the United States the index of the Department of Labor was generally recognized as the best, but it was based upon about 325 price quotations while most of the foreign indexes consisted of no more than 50 or 60. It seemed essential, therefore, as a prerequisite to accurate studies of price trends or price levels in different countries, to have a series of comparable or at least representative index numbers. In the course of the two years since that time a great deal of price work has been done in foreign countries, so that the situation is altered in important respects. In England the Board of Trade has revised and enlarged its index. The same is true of the Bachi index for Italy, while in Germany the *Frankfurter Zeitung* has constructed a new fairly large one. It is now possible, therefore, to make fairly accurate comparisons of wholesale prices in general in these countries, both on a paper and on a gold currency basis. The greatest value in the work of the Federal Reserve Board is that it concentrates within one organization an unusually comprehensive body of comparable international price material and that this material is handled in a similar fashion in the construction of its various index numbers. In addition, new classifications of commodities have been made which bring out interesting facts for the student of international price relationships. It also appears to be fairly well established, in view of the similarity between the Board of Trade and the Federal Reserve Board indexes for England, and between the Department of Labor and the Federal Reserve Board indexes for the United States, that very satisfactory wholesale price indexes can be constructed on the basis of less than 100 quotations.

MONTHLY PRODUCTION OF PIG IRON, 1884 TO 1903

By MARGARET G. MYERS

Production of pig iron is perhaps the best single index which we have of the volume of industrial activity in the United States. Its fluctuations agree closely with a number of composite indexes of business and industrial activity which have been made up from time to time, and they also tend to move with such records of general business activity as employment, bank clearings, and freight traffic. For this reason the fluctuations are of unusual interest. Annual figures on pig iron production are available practically continuously as far back as 1846. Monthly figures, however, were not collected until 1903, when the *Iron Age* began a compilation for the different kinds of pig iron.